T W O

SCOPE, APPLICATION, AND INTEGRATION

2.1 BACKGROUND

Integrating relevant Occupational Safety and Health Administration (OSHA) and Department of Energy (DOE) rules, requirements, and guidance and corresponding documentation is key to planning and conducting a safe and healthful hazardous waste project. A compliance strategy that uses a risk- and hazard-based approach to implement numerous rules and requirements can prevent duplication. Thus, a comprehensive, cost-effective program to protect worker health and safety becomes an integral part of the project.

2.2 THE HEALTH AND SAFETY UMBRELLA

Figure 2-1 provides a conceptual framework for understanding the relationship of a broad spectrum of environmental management activities and health and safety standards of practice. Within this framework, environmental management is a dynamic process that generally progresses from deactivation to remediation. Deactivation results in a stabilized facility. Surveillance and maintenance (S&M), an intermediate step in this process, allows required systems to operate until the facility is decommissioned. Decommissioning, which consists of decontamination and dismantlement (D&D), proceeds to remediation.

Process Safety

The process safety code of management practices (which has been developed by leading private-sector chemical manufacturers and is sometimes called "Responsible Care®") refers to management practices that integrate process safety information, hazard and operability studies (HAZOPS), health and safety plans, management of change, operating procedures, safe work practices, training, mechanical integrity of critical equipment, pre-startup safety reviews, emergency response and control, investigation of incidents, and management system audits.

Application of the provisions of the appropriate rule or requirement depends on the specific facility or site, its hazards, and the possibility for worker exposure to these hazards. As Figure 2-1 illustrates, the OSHA "Hazardous Waste Operations and Emergency Response" (HAZWOPER) Standard is the dominant set of regulatory requirements that govern worker protection during hazardous waste remediation. At the other end of the continuum, DOE operational safety rules and requirements and the process safety code of management practices are relevant to operational facilities undergoing deactivation. Only hazardous waste management and hazardous material emergency response functions fall under the scope of the HAZWOPER Standard at DOE operational facilities. Operational safety standards of practice and OSHA HAZWOPER are compatible and complement each other throughout the progression from deactivation and decommissioning into remediation. All activities are governed by DOE and DOE-adopted nuclear and nonnuclear rules and requirements, as illustrated by the "umbrella" (e.g., the OSHA Confined-Space-Entry Standard applies to any confined-space entry, whether it is performed at an operational facility or during hazardous waste remediation).

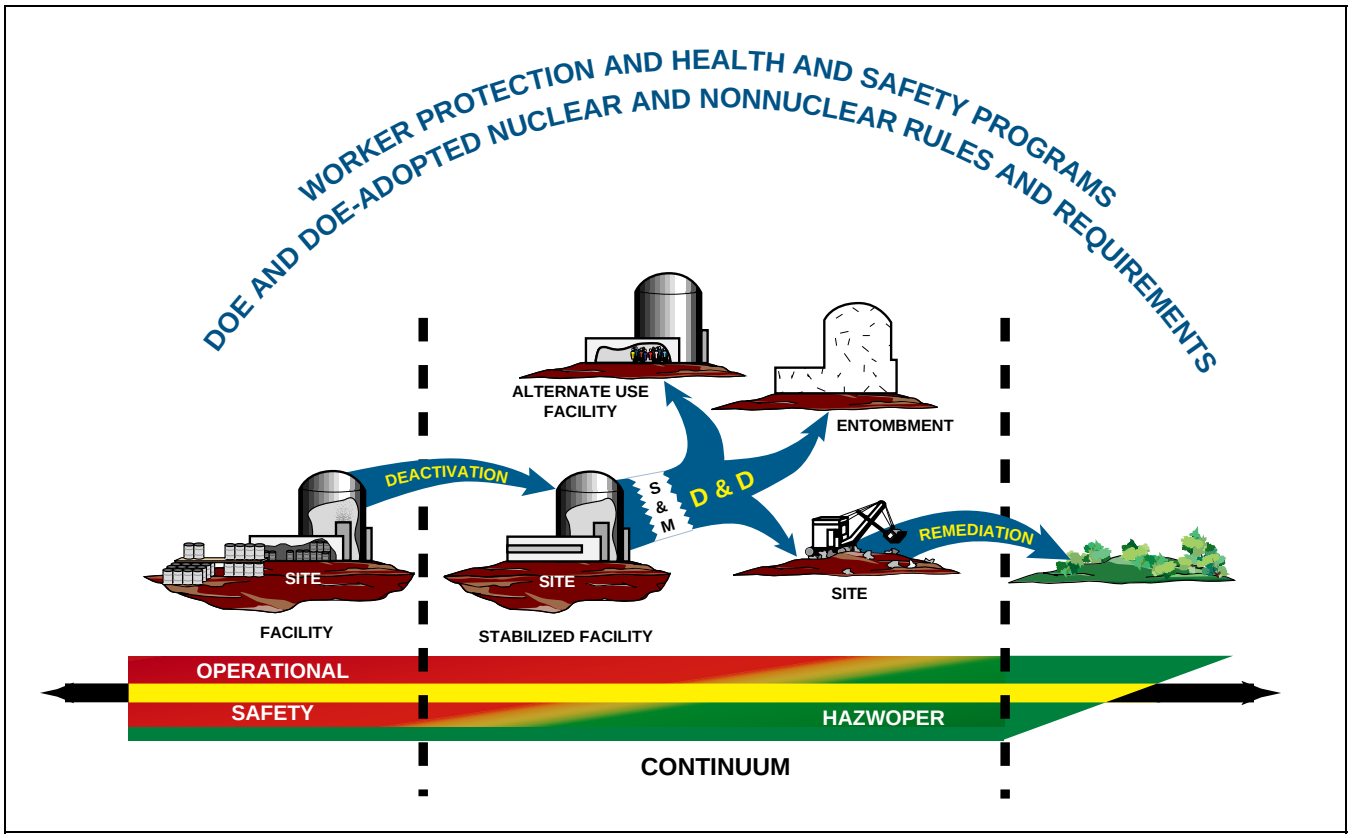


Figure 2-1. The Health and Safety Umbrella

2.3 DOES THE OPERATION FALL UNDER HAZWOPER?

Operations and activities conducted at individual worksites and locations are evaluated to determine if they fall under the HAZWOPER Standard based on an understanding of the scope of the standard as stated in 29 CFR 1910.120 (a) and the possibility for worker exposure to safety and health hazards from hazardous waste operations. Determining coverage under 29 CFR 1910.120 (a) is simplified through use of a model (Figure 2-2) and two implied questions. The answer to each question must be "yes" for the operation or activity to fall under HAZWOPER.

1 Is the actual *worksite or location* a required cleanup of an uncontrolled hazardous waste site, including initial investigation of areas of known or suspected contamination to determine the presence or absence of hazardous substances; a Resource Conservation and Recovery Act (RCRA) corrective action cleanup site; a voluntary cleanup of a government-recognized uncontrolled hazardous waste site; a RCRA treatment, storage, and disposal (TSD) facility with operations that involve hazardous wastes or substances; or an emergency response operation involving the release (or substantial threat of release) of hazardous wastes or substances?

- If the project is at a worksite or location that is a cleanup of an Environmental Protection Agency (EPA) National Priorities List (NPL) or State priority list site—or within a RCRA-regulated TSD facility, the answer to this question is "yes." (The answer would also be "yes" for voluntary or government-required cleanups or initial investigations to determine the absence or presence of hazardous wastes or substances.)

- If the project is a corrective action involving cleanup at a RCRA TSD facility where releases to the environment involving hazardous wastes and substances have occurred, the answer is "yes."

- If a facility or site does not meet the criteria to be placed on a priority site list, cleanup is still covered under the HAZWOPER Standard if uncontrolled hazardous wastes or substances are present or suspected of being present. For these types of worksites the answer is "yes."

- Certain DOE decommissioning activities involving hazardous waste are covered by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and fall under HAZWOPER as a result of a policy on decommissioning DOE facilities that went into effect on May 22, 1995. See text box below.

2 Does the activity pose a reasonable *possibility for exposure* or does the activity *inherently expose* workers to hazardous wastes or substances, or to health and safety hazards from a hazardous waste operation?

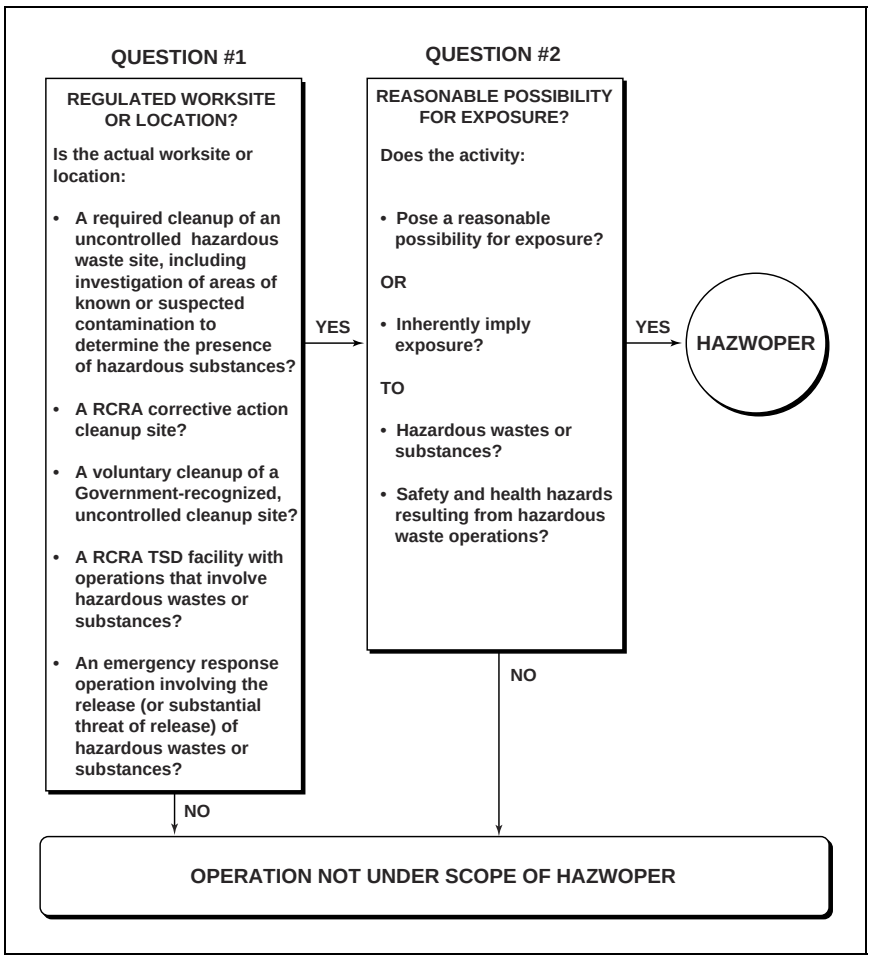


Figure 2-2. Determining OSHA HAZWOPER Scope

- HAZWOPER applies only where exposure to hazardous wastes and substances or to health and safety hazards resulting from a hazardous waste operation is likely. This can be determined by analysis of monitoring data, by hazard characterization or hazard analysis and exposure assessment by a competent person, or by limiting access. If there is exposure or a reasonable possibility for exposure, the answer to this question is "yes."

- Some activities are inherently covered by the OSHA HAZWOPER Standard. Emergency response usually means that contaminants exist in quantities that pose a hazard. Emergency responders thus have a reasonable possibility for exposure. Hazardous waste management likewise implies HAZWOPER coverage.

Policy on Decommissioning DOE Facilities Falling Under CERCLA

In May 1995, DOE and EPA agreed on a policy for the conduct of DOE decommissioning projects consistent with CERCLA requirements. This policy stipulates that DOE and EPA determine when CERCLA response authority is used to decommission DOE facilities. The "Policy on Decommissioning Department of Energy Facilities Under CERCLA," and the document that describes the application of this policy are contained in DOE-EM-0246, "Decommissioning Resource Manual."

When decommissioning activities are determined to fall under the scope of CERCLA, HAZWOPER also applies if there is a reasonable possibility for employee exposure to hazardous wastes or substances, or to health and safety hazards from a hazardous waste operation associated with those decommissioning activities.

For these activities, the answer to this question is "yes." (Note: Read Example 2-5 before answering this question with a "yes" for emergency response and waste management activities.)

EXPOSURE IN RELATION TO SCOPE

A conceptual understanding that relates exposure to regulatory scope simplifies answering the above questions. When determining the scope of the HAZWOPER Standard, exposure has two elements—the presence of a hazard and worker access to the hazard (see Figure 2-3). For example, contaminated areas of a hazardous waste site potentially pose health hazards. For exposure to occur, workers must have access to the hazard (e.g., they work in contaminated areas). Under normal circumstances, workers who are prevented from entering contaminated areas (by using access controls—see Chapter 7) are not exposed and do not fall under the standard, provided that they are not exposed to safety hazards resulting from the hazardous waste operation (see Examples 2-1 and 2-2). Conversely, workers in contaminated areas are covered because they have access to health hazards and could be exposed.

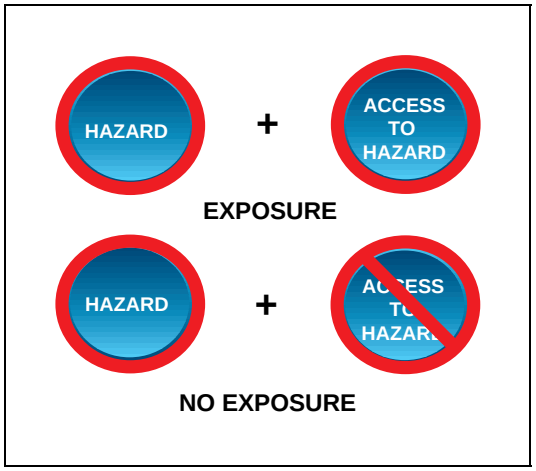


Figure 2-3. The Two Elements of Exposure

Safety hazards are treated in the same manner. Workers who work in trenches in clean areas of the site would be covered by the OSHA Trenching Standard. Workers who work in trenches in contaminated areas would fall under both the OSHA Trenching and HAZWOPER Standards. Workers who do not work in trenches fall under the HAZWOPER Standard only when working in contaminated areas and would not be covered by either standard when working solely in clean areas, provided they are not exposed to safety hazards resulting from hazardous waste operations.

Truck drivers at the Oak Ridge K-25 Plant haul clean clay fill to a clean fill area within the exclusion zone of a hazardous waste operation. The drivers are under instructions not to leave their trucks, and they are prevented from driving through contaminated areas. Monitoring data indicate that these workers have no reasonable possibility for exposure to hazardous wastes or substances. Thus, the hauling operation is not covered by OSHA HAZWOPER since the truck drivers are not exposed to hazardous wastes or substances. The truck drivers are exposed to safety hazards which are a result of the hauling operation, not the hazardous waste operation. The truck drivers must successfully complete appropriate training (e.g., the site-specific briefing, General Employee Training, and defensive driving training), but no core HAZWOPER training is required. The procedures truck drivers follow are documented in the Health and Safety Plan (HASP). A competent person should periodically monitor the hauling operation to verify that the workers continue to have no reasonable possibility for exposure.

Example 2-1

Utility workers service an electrical box located in an exclusion zone. Hazard characterization and exposure assessment performed by a competent person show that the area surrounding the box and an access corridor leading to the box can be cleaned such that the utility workers can work in the area and transit the corridor without possible exposure to hazardous wastes and substances. The work can be carried out as a normal maintenance operation. The area and corridor are free of safety hazards arising from hazardous waste operations. The work does not fall under the OSHA HAZWOPER Standard. In essence, the area and corridor constitute a temporary support zone. Since the work involves electrical utilities, it would fall under the most protective standard of practice (e.g., the OSHA Electrical Standard). Administrative controls such as HAZWOPER-trained escorts are used to make certain that the utility workers are not exposed to any hazards from the hazardous waste operation. The procedures to be followed are documented in the HASP.

Example 2-2

This type of analysis excludes many routine activities from the jurisdiction of the OSHA HAZWOPER Standard while continuing to provide adequate and appropriate worker protection. The HAZWOPER Standard does not cover clerical or support personnel, workers at the perimeter of a hazardous waste worksite, or workers engaged in construction activities in uncontaminated areas, provided they are not exposed or possibly exposed

to hazards resulting from hazardous waste operations. These workers would fall under the scope of other appropriate standards of practice that are more protective of health and safety.

INTERPRETATION OF SCOPE

Examples illustrating interpretation of the scope of the HAZWOPER Standard are found throughout this document. Such interpretations are permissible because HAZWOPER is a performance-based standard. OSHA provides guidance on interpretation, including numerous examples, in its publication *OSHA HAZWOPER Interpretive Quips* (known as the *HAZWOPER IQs*). The IQs are policy statements abstracted from official OSHA letters of interpretation. OSHA is clear that the IQs represent guidance and that decisions regarding scope should be supported by hazard characterization and exposure assessment (see Chapter 5) and should be made by a competent person (e.g., health and safety professional).

2.4 APPLICATION OF THE OSHA HAZWOPER STANDARD

Once the decision is made that an operation falls under the HAZWOPER Standard, the appropriate paragraphs of the standard are applied to specific activities. Paragraphs (b) through (o) apply to environmental remediation and corrective actions, paragraph (p) applies to RCRA-regulated TSD facilities, and paragraph (q) applies to certain emergency responses to releases (or threats of releases) of hazardous wastes or substances, without regard to location. The colored boxes in Figure 2-4 depict the HAZWOPER Standard programmatic requirements for cleanup as they relate to medical surveillance (blue), training (green), standard operating procedures (yellow), and the site-specific HASP (red).

Scope and Application

It is important to differentiate between scope and application of a standard of practice. *Scope* determines whether an operation or location is "covered" or "governed" by the standard. *Application* determines which portions (e.g., paragraphs) of the standard apply to the particular operation or location.

When the applicability of the HAZWOPER Standard is being determined, OSHA stipulates that if there is conflict or overlap with another standard, the provision more protective of worker health and safety applies (see Examples 2-3 and 2-4); for example, in considering workers in contaminated areas of the site who work on scaffolds, the OSHA Scaffolding Standards are more protective than is the HAZWOPER Standard for safety

An environmental remediation planned at an NPL-listed site falls within the scope of the OSHA HAZWOPER Standard. The worksite includes an abandoned building that has been slated for renovation for use as a storage facility for later operations. The building contains concrete walls with lead-based paint covering them. The building also contains large quantities of friable asbestos, in the ceiling insulation and pipe wrappings. There are no other hazardous substances or wastes present in the buildings.

For asbestos removal, the provisions of the OSHA Asbestos Standard are more protective of worker health and safety than are the more general provisions of the OSHA HAZWOPER Standard. The HASP therefore provides that the asbestos removal tasks conducted inside the building will be performed in full accord with the OSHA Asbestos Standard and not HAZWOPER.

After the asbestos has been removed, the lead-based paint will be removed. Again, the provisions of the OSHA Standard for lead removal are more protective of worker health and safety than are the more general provisions of the OSHA HAZWOPER Standard. Therefore, the removal of the lead-based paint inside the building will be performed in full compliance with the OSHA Lead Standard, and not HAZWOPER.

Example 2-3

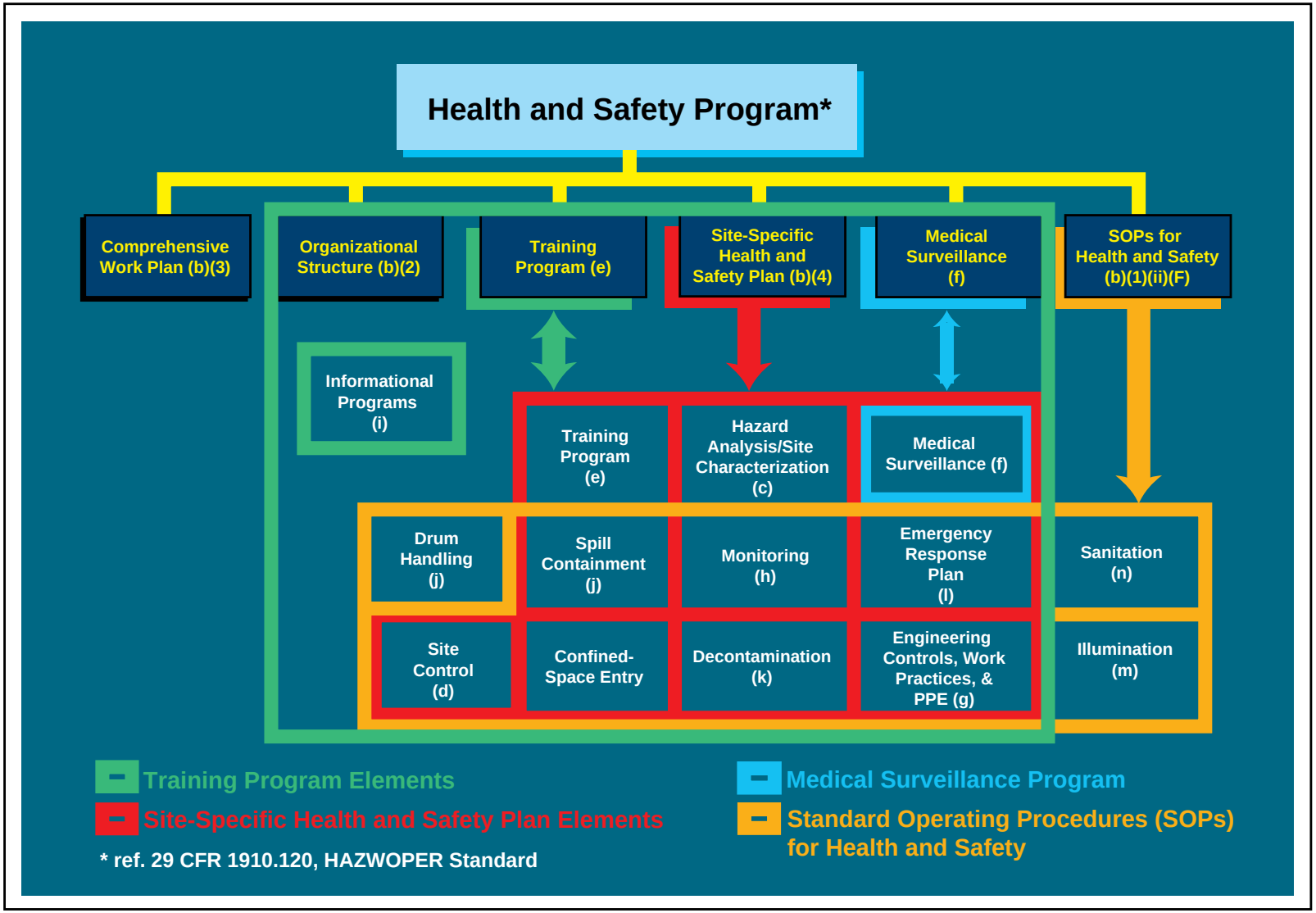


Figure 2-4. Health and Safety Program for Hazardous Waste Site Cleanup

hazards resulting from working on scaffolds. The HAZWOPER Standard is more protective for health hazards resulting from the contamination. The applicable provisions of both standards would apply to the work.

A RCRA TSD facility consists of tank farms and waste-water treatment plants handling low-level radiological waste water. The tank farms with uncontrolled environmental releases undergo corrective actions. Do paragraphs (b) through (o) of OSHA HAZWOPER apply to the entire facility? Does paragraph (p) apply to the part of the TSD not undergoing corrective action? Would paragraphs (b) through (o) apply to routine decontamination of the TSD? Paragraphs (b) through (o) apply only to the portions undergoing remediation. If normal operations are not affected by the uncontrolled releases, paragraph (p) would apply to those unaffected areas. Defining decontamination activities using established controls for normal operation places these activities under 29 CFR 1910.120 (p). For example, decontamination of the Evaporator Facility at Hanford is controlled by standard operating procedures, safe work permits, and as-needed task instructions as part of the overall health and safety program. Similarly, routine maintenance or replacement of process lines in the waste-water treatment facility would be work covered under paragraph (p). Remediation efforts to clean up leaks at the tank farms are covered under paragraphs (b) through (o).

Example 2-4

2.5 APPLICATION OF HAZWOPER TO OTHER DOE ACTIVITIES

Certain activities conducted by DOE normally fall outside the scope of the HAZWOPER Standard. For these activities, DOE has adopted an approach that uses HAZWOPER concepts and principles as a framework, not as a rigid standard for the planning and conduct of these activities. Table 2-1 summarizes some considerations when determining the application of OSHA HAZWOPER as a framework for projects not strictly regulated by the standard. The following procedure can be used to apply HAZWOPER to these types of projects:

Use HAZWOPER concepts and principles as a framework for:

- Deactivation
- Certain D&D activities that do not fall under CERCLA
- S&M activities
- Non-RCRA-permitted TSDs
- Construction
- Laboratory activities
- Research and development (R&D) activities
- Satellite accumulation sites

- ***Determine whether OSHA HAZWOPER needs to be strictly applied*** or whether applying its concepts or principles would suffice. This determination should be made by health and safety professionals responsible for hazardous waste activities.
- ***Apply all elements of HAZWOPER to environmental remediations involving radioactive wastes and materials.*** (Note: OSHA treats radiological and nonradiological environmental remediation activities similarly.)
- ***Develop a work plan*** identifying jobs and tasks that require hazard analyses.
- ***Integrate hazard analyses to identify worker hazards and to provide a basis for specification of job and task hazard controls.*** DOE-EM-STD-5502-94, "Hazard Baseline Documentation," provides a decision logic with quantitative criteria for classifying different types of facilities and activities based on DOE-STD-1027-92. The HAZWOPER Standard requires baseline, task-based, periodic, and other types of hazard analyses. Chapter 5, "Hazard Characterization and Exposure Assessment," provides guidance on conducting hazard analyses using the OSHA HAZWOPER job, task, and hazard analysis (JTHA) approach.

Table 2-1. Considerations When Applying OSHA HAZWOPER to Other DOE Activities

Activity	Considerations When Applying HAZWOPER
Deactivation and certain D&D, including S&M	Deactivation and S&M activities (except for some waste management and emergency response activities) are generally not within the scope of the HAZWOPER Standard. Certain D&D activities that do not fall under CERCLA likewise do not fall under HAZWOPER. Even where the HAZWOPER Standard is not applicable, DOE requires a HASP in accordance with DOE-EM-STD-5502-94. In this case, activities are listed in the HASP as separate tasks, and job controls are specified by a hazard-based approach. S&M can involve confined-space entry, exposure to radiological and other health hazards during maintenance activities (e.g., changeout of HEPA filters), entry into radiologically controlled areas, and a variety of occupational safety hazards. When these hazards do not involve hazardous waste activities, worker protection is provided through the existing health and safety program.
Non-RCRA-Permitted TSDs	Non-RCRA-permitted TSDs, and waste treatment activities not covered by RCRA (e.g., waste-water treatment facilities permitted under the Clean Water Act) are not covered by HAZWOPER, except for emergency response and some limited waste management operations. Specific HAZWOPER elements are assimilated into the existing health and safety program based on hazard analyses. Worker protection requirements are met through existing health and safety and radiological protection programs.
Construction	If there is a reasonable possibility that hazardous wastes or substances could be encountered during intrusive operations, HAZWOPER applicability is determined during the project's planning stage, based on hazard analyses and the possibility for exposure. Construction health and safety measures stipulated in DOE O 440.1 are incorporated in the HASP.
Laboratory and R&D Activities	Bench-scale laboratory and R&D activities must comply with the OSHA Laboratory Standard (29 CFR 1910.1450). R&D activities involving pilot- or full-scale field operations must comply with the HAZWOPER Standard when there is reasonable possibility for worker exposure to hazardous wastes or substances.
Satellite Accumulation Sites and Non-TSD Waste Management Activities	OSHA allows conditional exemptions for small-quantity generators (i.e., those that accumulate less than 100 kilograms per calendar month) and full exemptions for storage areas housing hazardous waste for 90 days or less. With proper documentation, these do not fall under HAZWOPER. However, EPA stipulates that 90-day generators require their employees to be trained to participate in emergency response activities. An emergency response plan or emergency evacuation plan is also required for each site. Emergency response provisions of paragraph (p) are applicable, depending on employee responsibilities in responding to spills.

- ***Establish a health and safety organization and program*,** as outlined in 29 CFR 1910.120 (b), that applies pertinent elements of the HAZWOPER Standard. For some facilities and activities, this will represent enhancements to existing health and safety organizations and programs.

- ***Develop a hazard-based, site-specific HASP*.** (Chapter 6, "Development of a Site-Specific Health and Safety Plan," provides guidance on how to enhance existing programs and procedures to apply to activities not explicitly within the scope of the HAZWOPER Standard.)

OSHA has clarified the HAZWOPER Standard's application to some waste management and emergency response activities. For example, drum-handling and similar tasks that are controlled by operational safety procedures and that occur within a building's envelope are generally not covered. Likewise, small, localized spills (e.g., from a 5-gallon pail) that are readily controlled by workers normally assigned to the operation are generally not covered. However, large, uncontrolled spills or removals of drums that occur outside the building's envelope are covered.

Example 2-5

- ***Assign a Site Safety and Health Officer (SSHO) to implement the health and safety program and plan.*** (Chapter 3, "Organization and Planning," describes the role and responsibilities of SSHOs.)

- ***Provide appropriate training and medical monitoring*** based on a needs analysis.

2.6 INTEGRATION OF KEY DOE REQUIREMENTS WITH HAZWOPER ACTIVITIES

Hazardous waste activities are subject to a myriad of DOE and DOE-adopted nuclear and nonnuclear rules and requirements (see Section 2.7, "References" and discussion below) that vary in focus and scope. It is important to understand the family of applicable rules and requirements, determine compatibilities, and develop an integrated approach to hazard analyses and health and safety planning. The key objectives of integration involve using a multidisciplinary team approach to accomplish the following:

- Optimize worker health and safety by focusing on those hazard analysis elements that apply to jobs and tasks.

- Minimize duplication of effort in the development of overall hazard baseline documents that identify and specify controls for radiological and nonradiological hazards (e.g., coordinate hazard analyses required for safety analysis reports (SARs), Basis for Interim Operations (BIO), Auditable Safety Analysis (ASA), Unreviewed Safety Questions (USQs), construction project safety and health plans, and HAZWOPER-required HASPs).

- Use work control systems as a vehicle for enhanced communication and cooperation between nuclear and nonnuclear personnel to develop documents at the job- and task-specific level in a timely and cost-effective manner.

Multidisciplinary Team Approach

"HAZWOPER worksites are subject to the same rules and requirements as other operating or construction sites, where DOE requires classification and documentation of an authorized safety basis. Engaging a multidisciplinary team in the early phases of the project to address health and safety issues achieves integration and reduces duplication."

THE MULTIDISCIPLINARY TEAM APPROACH TO PLANNING IS DISCUSSED IN CHAPTER 3.

WORK CONTROL SYSTEM

Health and safety planning and implementation emphasize jobs and tasks. Many DOE sites have an established work control system (WCS) that is focused at the job and task level. Workers are familiar with the WCS and understand its content because each work-task package, which includes checklists and permits, is a normal part of daily work. Hundreds of cleanup activities are task-oriented (rather than process-oriented) with

short duration, and the WCS is a practical vehicle for managing and conducting these activities. The WCS supports the HASP by providing a mechanism to accomplish the following:

- Integrate the hazard analyses;
- Evaluate proposed tasks to verify that the authorized safety basis for operations is not violated; and
- Promote integrated participation by workers, managers, and health and safety professionals.

Detailed discussions of the WCS are found in Chapter 3, "Organization and Planning," and Chapter 6, "Development of a Site-Specific Health and Safety Plan."

ORDERS AND STANDARDS FOR IMPLEMENTATION OF HEALTH AND SAFETY REQUIREMENTS

Orders. Section 2.7 lists a number of rules and requirements that govern DOE hazardous waste work. The principal DOE Orders for implementing health and safety requirements at HAZWOPER sites are as follows:

- DOE 5480.21, 5480.22, and 5480.23, which address nuclear facility hazard classification safety analyses and controls; and
- DOE O 440.1, which provides for application of all OSHA standards (including 29 CFR 1910 and 29 CFR 1926) to DOE activities; establishes industrial hygiene program requirements for DOE activities; and addresses construction-related issues, including HAZWOPER activities and D&D.

Because DOE manages many activities as construction projects (e.g., deactivation, decommissioning, and remediation), the construction-related requirements of DOE O 440.1 have special applicability. Elements of DOE O 440.1 (e.g., training and hazard analysis and control) parallel those found in the HAZWOPER Standard and provide opportunities for information-sharing and for minimizing duplication.

Standards. DOE-STD-1027-92 prescribes the types, formats, and levels of hazard analyses and documentation required for an operation to proceed. These documents establish the health and safety parameters for the operation and provide the "authorized safety basis" for its conduct. Two other DOE limited standards have particular importance for DOE hazardous waste activities: DOE-EM-STD-5502-94 and DOE-EM-STD-5503-94. DOE-EM-STD-5502-94 describes hazard analysis requirements and processes for facilities (defined as activities, projects, and physical facilities) and discusses the integration of hazard analysis processes. DOE-EM-STD-5502-94 applies to all life-cycle stages of an EM facility including construction, operations, deactivation, decommissioning, D&D, removal, disposal, and remediation. It allows for the grouping of activities into "facilities" for the purposes of health and safety documentation development and, together with other relevant DOE requirements, provides a technical basis for protecting public and worker health and safety. DOE-EM-STD-5502-94 defines four classes of facilities (nuclear, nonnuclear, radiological, and other industrial facilities), the thresholds for facility hazard classification, and the applicable health and safety hazard identification, controls, and documentation. It also prescribes the development of site-specific HASPs for facilities conducting hazardous waste activities. DOE-EM-STD-5503-94 provides guidance on the development of HASPs for remedial actions at uncontrolled hazardous waste sites. In addition, DOE-STD-3009-94 provides guidance on hazard analysis and health and safety documentation for facilities and operations with higher hazard classifications, including some environmental restoration and waste management operations.

HAZARD ANALYSIS

Historically, the SAR process has not addressed hazards associated with specific jobs and tasks; rather, it has stressed operational facility and public protection issues. DOE-STD-3009-94 provides guidance on systematic hazard analyses for higher hazard nonreactor nuclear facilities. It prescribes a safety analysis process that focuses on risks to workers and a team approach to hazard analysis and control. The HASP emphasizes worker protection at the job and task level, and it is the governing document that identifies, evaluates, controls, and communicates hazards to workers. The SAR hazard analysis is considered in the preparation of the HASP, with relevant insights and information extracted and applied to worker job and task hazard analysis.

Sometimes multiple levels of analysis are necessary—for example, when the restoration process involves worker and public health and safety issues (see Example 2-6).

As stated in DOE-STD-1027-92:

> "...radiological facilities shall develop an auditable (defendable) safety analysis (similar to SAR but with reduced content and requirements). An auditable safety analysis (ASA):
>
> - Provides systematic identification of hazards within a given DOE operation; and
> - Describes and analyzes the adequacy of measures taken to eliminate, control, or mitigate identified hazards.
>
> Radiological facilities with hazardous waste activities require the development and maintenance of a HASP. The HASP process shall incorporate the results of, or document the ASA which may be integrated into the task analysis..."

Caution: Hazard analyses, for a variety of hazard baseline documents, are frequently developed by different groups within DOE and contractor organizations. There is the real risk that these groups may not communicate, causing inconsistencies in assumptions affecting worker health and safety. A USQ or "USQ-like" process, as discussed in DOE-EM-STD-5502-94, DOE 5480.21, and DOE 5480.23, provides a mechanism to deal with these inconsistencies, but a team approach can foster communication and alleviate the risk. (See the discussion of the USQ process below.)

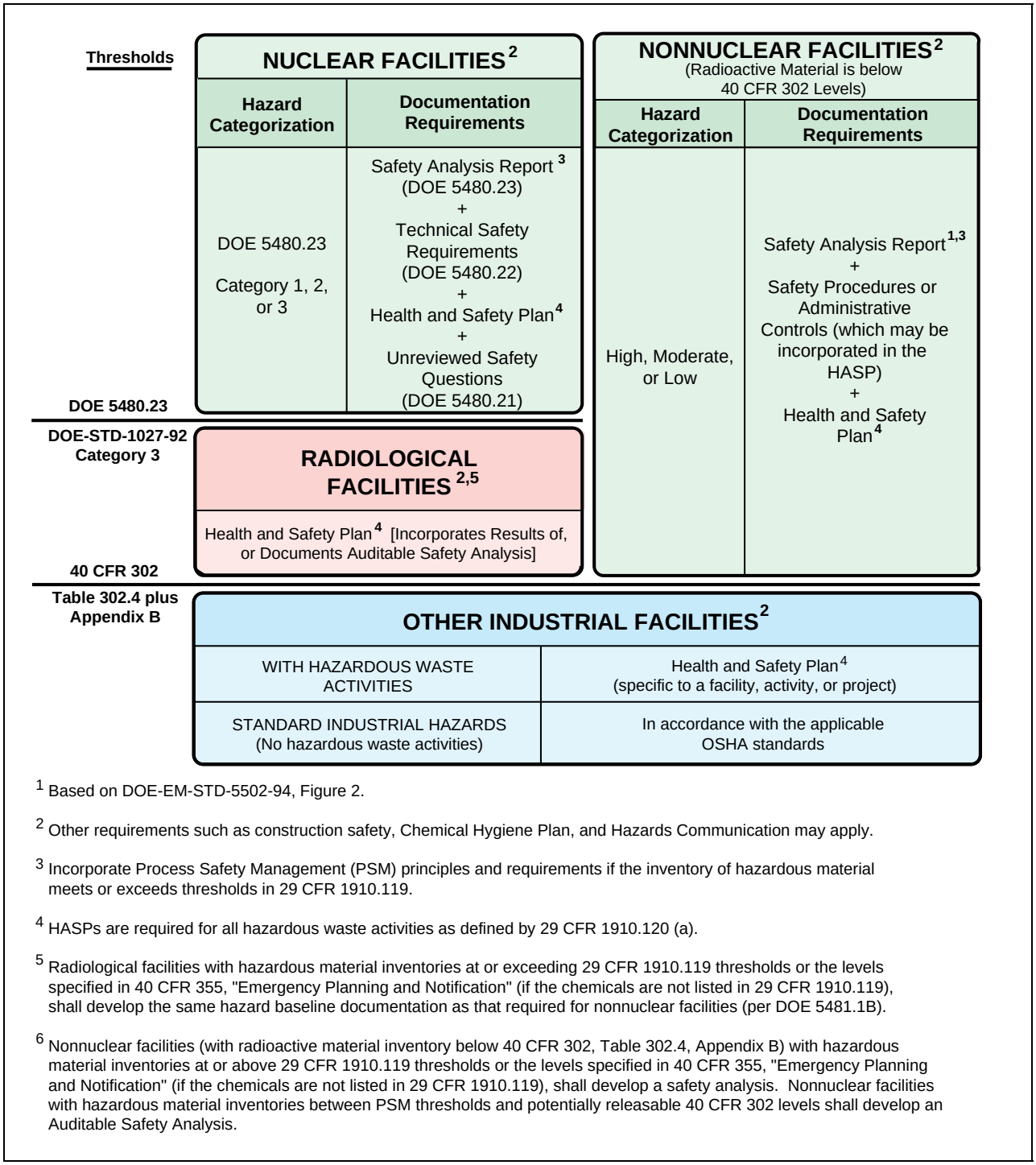
Many hazardous waste facilities and activities in the DOE complex are expected to be classified as "radiological," "low hazard non-nuclear," or "industrial." For these classes, the dominant hazards during environmental restoration will be to the workers; the HASP will generally be sufficient to control hazards in terms of worker health and safety. However, there are a number of surplus nuclear facilities and activities that are in the high and medium hazard classes which are now (or soon will be) under DOE's EM program. These facilities and activities contain plutonium and uranium inventories and a large volume of hazardous chemicals left over from the production and operational phases, including production and R&D reactors, and chemical processing plants. Examples include the N-Reactor, high level waste tank farms, and the PUREX plant at the Hanford Reservation. Restoration activities at these locations may involve significant hazards to the public as well as to workers and will require that any SAR considerations be carefully integrated throughout the work planning process.

Example 2-6

CLASSIFICATION OF HAZARDOUS WASTE ACTIVITY AND FACILITY

DOE has established a hazard-based approach to rank its facilities and activities that establishes levels of documentation, review, and approval based on radiological and chemical inventories that are thresholds. Each threshold requires a specific level of hazard analysis and corresponding documentation that details the authorization basis for the facility and activity (i.e., "those aspects of the facility design basis and operational requirements relied upon by DOE to authorize operation..." [DOE-EM-STD-5502-94, Section 3.1]). The four major groupings of facilities and activities are nuclear, radiological, nonnuclear, and industrial (see Figure 2-5). A facility or activity can be further categorized within a grouping.

DOE-EM-STD-5502-94 provides a decision logic with quantitative criteria for classifying different types of facilities and activities based on DOE-STD-1027-92. Additional requirements for, and guidance on, this process are available in a number of other documents including DOE-STD-3009-94, 10 CFR 830, DOE 5480.23, DOE 5480.22, and DOE 5480.21 (see Examples 2-7, 2-8, and 2-9). (Note: These standards refer to hazardous waste activities as "facilities or activities.")



[1] Based on DOE-EM-STD-5502-94, Figure 2.

[2] Other requirements such as construction safety, Chemical Hygiene Plan, and Hazards Communication may apply.

[3] Incorporate Process Safety Management (PSM) principles and requirements if the inventory of hazardous material meets or exceeds thresholds in 29 CFR 1910.119.

[4] HASPs are required for all hazardous waste activities as defined by 29 CFR 1910.120 (a).

[5] Radiological facilities with hazardous material inventories at or exceeding 29 CFR 1910.119 thresholds or the levels specified in 40 CFR 355, "Emergency Planning and Notification" (if the chemicals are not listed in 29 CFR 1910.119), shall develop the same hazard baseline documentation as that required for nonnuclear facilities (per DOE 5481.1B).

[6] Nonnuclear facilities (with radioactive material inventory below 40 CFR 302, Table 302.4, Appendix B) with hazardous material inventories at or above 29 CFR 1910.119 thresholds or the levels specified in 40 CFR 355, "Emergency Planning and Notification" (if the chemicals are not listed in 29 CFR 1910.119), shall develop a safety analysis. Nonnuclear facilities with hazardous material inventories between PSM thresholds and potentially releasable 40 CFR 302 levels shall develop an Auditable Safety Analysis.

Figure 2-5. Illustrating the Relationship Among the Different Classes of EM Facilities[1]

Drums have been recovered with highly radioactive mixed waste and are in a storage facility. The facility thresholds exceed those defined in DOE-STD-1027-92, "Hazard Characterization and Accident Analysis Techniques for Compliance with DOE Order 5480.23," and will require a SAR developed in accordance with the requirements of DOE 5480.23 and guidance provided in DOE-STD-3009-94 for nonreactor nuclear facility SARs. The SAR hazard analysis will focus on the inventory of radioactive and hazardous materials that may be in the drums and on protecting the public, workers, and the environment from their release. The hazard analysis developed for the SAR should be performed by a multidisciplinary team using an approach similar to that defined for process hazard analysis in the OSHA standard for process safety management (29 CFR 1910.119).

For consistency, cost-savings, and to avoid duplication of effort, the SAR hazard analysis should be used and/or integrated into other hazard baseline documents such as the site-specific HASP. Similarly, the hazard identification and analysis information and HASP, prepared during the planning process for the initial characterization phase, may be used in preparation of the SAR. Specifically, in some cases this information may be used as input to the hazard analysis component of the SAR.

Example 2-7

Work is being planned for a worksite with buried drums of highly radioactive mixed waste identified as potentially being above the thresholds identified in DOE-STD-1027-92. This nonfacility nuclear operation would require the development of a Basis for Interim Operations (BIO) prepared in accordance with DOE-STD-3011-94, "Guidance for the Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans." The hazard analysis developed for the BIO will satisfy the safety analysis requirements of DOE 5480.23 and should be prepared by a multidisciplinary team. This information may also be used or integrated into other hazard baseline documents, such as the project HASP. The hazard identification and analysis information and HASP, prepared during the planning process for the initial hazard characterization phase for this operation, should be considered in preparation of the BIO. This information may provide valuable input into the hazard analysis component of the BIO.

Example 2-8

Contaminated soil is being removed in preparation for a construction project. Preliminary site characterization and hazard analysis have shown that the soil is radioactive below the thresholds for the Category 3 designation of DOE-STD-1027-92, but above those described in 40 CFR 302, Appendix B, "Designation, Reportable Quantities, and Notification." The project has, therefore, been classified as a radiological operation requiring development of an ASA and HASP as prescribed in DOE-EM-STD-5502-94. The ASA provides for the identification and control of hazards associated with radiological operations and may be used in, or integrated into, the project's site-specific HASP. The HASP prescribed by the EM Limited Standard must be developed in accordance with 29 CFR 1926.65 for this hazardous waste construction project. The project must also meet requirements of DOE O 440.1 and other relevant OSHA standards and DOE rules and requirements. The hazard analysis prepared for any of these purposes should be developed by a multidisciplinary team of personnel and used as input, wherever possible, in fulfilling similar provisions of each of these mandates.

Example 2-9

Hazardous waste activities with radiological material inventories exceeding threshold quantities specified in DOE-STD-1027-92 are categorized as "nuclear facilities or activities." "Radiological facilities or activities" have inventories below threshold quantities specified in DOE-STD-1027-92. "Nonnuclear facilities or activities" (which have only chemical inventories) have radiological materials below levels specified in 40 CFR 302. (Note: Hazard analysis requirements in 29 CFR 1910.119 and DOE O 440.1 may also apply to nonnuclear facilities.) If facilities or activities have radiological and hazardous chemical inventories below the thresholds specified in 40 CFR 302, they are classified as "other industrial facilities." Table 2-2 describes the relationship between facility classifications, hazard levels, and required documentation.

Table 2-2. Strategy for Integration of Requirements

General Category	Facility or Activity	Focus Area	Document	Type of Analysis
Hazardous Waste Operations with Radiological, Chemical, and Industrial Safety Hazards	Nuclear	Operational and Public Safety	SAR[1,2]	Hazard Analysis
		Worker Protection	HASP[3]	Hazard Characterization and Exposure Assessment
	Radiological	Worker Protection	HASP with ASA[4]	Hazard Analysis and Hazard Characterization and Exposure Assessment[5]
Hazardous Waste Operations with Chemical and Industrial Safety Hazards	Nonnuclear with Chemical Materials > PSM	Operational and Public Safety	Safety Analysis[2]	Hazard Analysis
		Worker Protection	HASP	Hazard Characterization and Exposure Assessment[5]
	Nonnuclear with Chemical Materials > 40 CFR 302	Worker Protection	HASP with ASA[4]	Hazard Characterization and Exposure Assessment[5]
Hazardous Waste Operations with Industrial Safety Hazards	Industrial	Worker Protection	HASP	Hazard Characterization and Exposure Assessment[5]

(1) Required by DOE 5480.23.

(2) Incorporate chemical safety principles and requirements if inventory meets or exceeds thresholds in 29 CFR 1910.119.

(3) Required by 29 CFR 1910.120.

(4) Auditable Safety Analysis (ASA) and its integration with the HASP are described in DOE-EM-STD-5502-94.

(5) As discussed in Chapter 5, hazard characterization and exposure assessment include worker exposure to all chemical, physical, and biological hazards in JTHA.

Facility and activity authorization is documented such that personnel understand the requirements. For some facilities, the Price-Anderson Amendments Act of 1988 has established civil and criminal penalties for failure to operate in accordance with the authorization basis. Hazardous waste activities managers need to anticipate how discovery of previously unforeseen hazards might impact either the authorization basis or the HASP. New hazards information is considered and addressed to the greatest extent possible in the documentation maintenance process.

UNREVIEWED SAFETY QUESTIONS

The USQ process verifies that potential changes or previously unanticipated hazards are screened to determine whether they are within the existing authorization basis, thus allowing changes to be made without additional approval (if within established parameters). If the change in conditions exceeds or would exceed the parameters of the authorization basis, then approval (based on the approval authority of the relevant hazard identification and control document) will be required before operations can commence. Since hazardous waste cleanup operations are dynamic in nature, it is prudent to establish a quick-response mechanism (e.g., a USQ screening and approval team) during these activities. Of course, HASPs must be immediately updated to reflect any changes in conditions, activities, and associated hazards. In these cases, document control is essential to ensure that only the most current version of a HASP is available and in use at the site.

OPPORTUNITIES FOR INTEGRATION

Some commonalities of health and safety documentation basis requirements of OSHA HAZWOPER, the SAR, and other DOE-specific safety processes provide an opportunity for information integration and sharing that minimizes duplication of effort in documentation development. Both the SAR and the HASP require a systematic approach to identify hazards through a hazard analysis process and documentation of applicable hazard controls. As previously discussed, the SAR stresses nuclear safety and operational and public protection issues, whereas the HASP focuses on worker protection at the job and task level. The mutual sharing of the identified hazards covered by both the SAR and the HASP, their associated control measures, and their respective documentation requirements allow the documentation developed in support of the SAR to be considered, referred to, or used when preparing a HASP. For example, a HASP may have been prepared for a project that later needs a SAR. The information developed for that HASP may provide valuable input for use in the preparation of the SAR.

2.7 REFERENCES

10 CFR 830, "Nuclear Safety Requirements"

10 CFR 835, "Occupational Radiation Protection"

29 CFR 1910, "Occupational Safety and Health Standards for General Industry"

29 CFR 1910.119, "Process Safety Management of Highly Hazardous Chemicals"

29 CFR 1910.120 and 1926.65, "Hazardous Waste Operations and Emergency Response"

29 CFR 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories"

29 CFR 1926, "Safety and Health Regulations for Construction"

40 CFR 302, "Designation of Reportable Quantities and Notification"

40 CFR 355, "Emergency Planning and Notification"

DOE N 441.1, "Radiological Protection for DOE Activities"

DOE O 151.1, "Comprehensive Emergency Management System"

DOE O 225.1, "Accident Investigations"

DOE O 231.1, "Environment, Safety, and Health Reporting"

DOE O 440.1, "Worker Protection Management for DOE Federal and Contractor Employees"

DOE O 460.1, "Packaging and Transportation Safety"

DOE O 460.2, "Departmental Materials Transportation and Packaging Management"

DOE 3790.1B, Chapter VIII, "Federal Employee Occupational Medical Program"

DOE 5480.21, "Unreviewed Safety Questions"

DOE 5480.22, "Technical Safety Requirements"

DOE 5480.23, "Nuclear Safety Analysis Reports"

DOE 5480.24, "Radioactive Waste Management"

DOE 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements" [except for portions canceled by DOE O 225.1 and O 231.1]

DOE 5610.1, "Packaging and Transportation of Nuclear Explosives, Nuclear Components, and Special Assemblies"

DOE 5700.6C, "Quality Assurance"

DOE 5820.2A, "Radioactive Waste Management"

DOE-STD-1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE 5480.23"

DOE-STD-1082-94, DOE Standard - "Preparation, Review, and Approval of Implementation Plans for Nuclear Safety Requirements"

DOE-STD-3009-94, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Report (Area SAFT)"

DOE-STD-3011-94, DOE Standard - "Guidance for the Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans"

DOE-EM-STD-5502-94, "Hazard Baseline Documentation"

DOE-EM-STD-5503-94, "DOE Limited Standard EM Health and Safety Plan Guidelines"

U.S. Department of Energy/U.S. Environmental Protection Agency Interagency Agreement, "Policy on Decommissioning Department of Energy Facilities Under CERCLA," May 22, 1995

U.S. Department of Energy Environmental Restoration Program "Decommissioning Implementation Guide," May 22, 1995

DOE-EM-0246, "Decommissioning Resource Manual"